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THE AMERICAN GAS LIGHT JOURNAL

REDMAN & KENNY, N.Y.

PUBLISHING OFFICE No. 42 PINE STREET

DEVOTED TO THE INTERESTS OF ILLUMINATION, VENTILATION, WATER SUPPLY AND DISTRIBUTION, & GENERAL SCIENCE.

VOLUME XXXIX. No. 2. Whole No. 578 | NEW YORK, MONDAY, JULY 16, 1883 | $3 PER ANNUM IN ADVANCE.

A. M. CALLENDER & CO., Proprietors. C. E. SANDERSON, Manager.
JOS. R. THOMAS, C.E., Editor.

ENTERED AT THE POST OFFICE AT NEW YORK, N. Y., AS SECOND CLASS MATTER.

Terms of Subscription, Including Postage.—For the United States and Canada, $3 per annum. European countries, $3.50 (15 shilling—18 francs). All payments to be made in advance. Single copies, 15 cents.

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BENCHES.

At the meeting of the Western Gas Association, held at Cincinnati, the proceedings of which are being published in this Journal, a paper was presented and read by Mr. T. G. Lansden, of St. Louis, Mo., giving his experience in relation to benches of three retorts in settings erected at the works of his company; and showing, also, the large production of gas per retort in the ordinary working of these benches.

From his paper we learn that the average make of gas from each retort is a little over 10,000 cubic feet per diem. This is certainly a very large production of gas per retort, and only proves what well-directed efforts will accomplish when steadily adhered to. At the same time, we do not think this make is in excess of what ought to be made in benches with six retorts in a setting, the retorts being of the same dimensions as those Mr. Lansden has in use; and assuredly it ought to be done with a less quantity of fuel for firing purposes, and also with less labor, per thousand cubic feet of gas manufactured, taking into consideration that the quantity of gas made in the benches of sixes would be twice the quantity of that made in the benches of threes.

Benches with three retorts in a setting are now seldom used in a works of any magnitude, the desire being for benches that will give the largest production of gas in a given time; and the larger benches have certainly sustained themselves in their practical working, both in large yields of gas and the economy of fuel used in carbonizing the coal in the retorts. While we favor the large settings, where a large quantity of gas is to be manufactured, there are also works where benches of threes are more suitable, being better adapted for the quantity of gas manufactured, and from the fact of not having sufficient help to properly work the larger ones.

We would not recommend the erection of benches of six retorts in a works where the minimum make of gas could be produced with nine or twelve retorts; and think, in such cases, that benches with three retorts in each would in every way be more beneficial in works of this kind, as the help employed is necessarily small, and better able to handle benches of three retorts each than larger ones.

In large works, where a great quantity of gas is to be manufactured, the disposition of those in charge is to get the largest yield possible from each bench, taking into consideration the floor surface covered with the benches, and also the durability of the bench, as important factors in connection with them, and also that each retort should produce the proper quantity of gas during its life.

In the early history of the setting of five retorts in a bench, the retorts being of the same dimensions as those that had formerly been in use in the setting of threes, it was claimed, and we think very thoroughly proved in the working, that very little more fuel, if any, was necessary in firing for the fives than had formerly been used in the threes. Admitting, however, for argument's sake, that the larger benches would require more fuel in firing than the smaller ones, and that a bench with six retorts would consume 50 per cent. more fuel in carbonizing the coal than a bench with three retorts; and also, at the same time, taking into consideration the greater quantity of coal carbonized in the large benches, it would show very conclusively the great advantage of using the larger number of retorts in a setting. Thus, if Mr. Lansden, in his benches of threes, uses for firing purposes 42 per cent. of the coke manufactured, and we add, say, 50 per cent. more to it for the bench of sixes, calling it 63, and at the same time there is twice the quantity

of coal being carbonized in the large bench, it will reduce the percentage of coke used of that made to 31½ per cent. as the quantity of coke necessary to burn off the charge of coal, thus showing a saving of 10½ per cent. of the coke made and not used. This would be an important factor in the residual account, as the saving in coke, when sold, would give 25 to 30 cents on every ton of coal carbonized.

The above is only approximating to what ought to be done. We are aware that, with the best built benches and settings, better results than those here mentioned have been obtained in many works in this country, and the percentage of fuel used much less than the 31½ per cent. given above.

In Europe and on the Continent the tendency in all the large works is for benches with a large number of retorts, using, in such benches, 7, 8, and 9 retorts in a setting; and they have, in the working of such benches, reduced the fuel used to a lower percentage than that obtained in any works in this country, so far as we know of—carbonizing the coal in them with the use of 15 to 25 per cent. of the coke produced.

In almost all of the large works in this country benches of six retorts are very generally used; benches of this kind are readily and easily handled, and can be drawn and charged one-half at a time, giving in this manner all the advantages Mr. Lansden claims of only having three retorts open at once. This system of charging has been followed out to a very great extent where benches of sixes are in use, and we think with very beneficial results to those working in this manner. Say that, if in drawing and charging a portion of the benches in a stack of sixes, the three retorts on one side of the bench to be drawn are drawn at one time; and when the duration of the charge is four hours, then, two hours after, the other retorts are drawn—in this way charging half of the bench every two hours. By this method of working a more uniform temperature can be kept up in the bench, and better results given in working off the charges to be carbonized.

The alternating of charges, we think, can be carried out very successfully, and also with economy, in all works where gas is manufactured, beginning with the smallest of operations in gas making, and where only a few retorts are necessary. Thus, if one bench of three retorts be able to make the gas required, draw and charge one retort at a time, at each hour, going over one hour prior to commencing again. If working two, three, or more benches, the same system can be carried out; and with any greater number of benches at work, divide the work as nearly as possible for each hour. In this manner of working, the make of gas will be nearly uniform; and in passing through the condensers, washer, and purifiers much better results will be obtained in each piece of apparatus, and the gas more efficiently cleaned from the contained impurities.

Action Taken by the Gas Institute in Reference to the Death of Major G. Warren Dresser.

At the Sheffield meeting of the Gas Institute (of which body the late Major G. Warren Dresser was an Honorary Member) the following action was taken:

"The President said his first duty was a very painful one—viz., to announce the death of one of the honorary members of the Institute, Major G. W. Dresser, of New York. For some years past Major Dresser had been a familiar figure at the annual gathering of the Institute, and he (the President) was quite sure it would be the desire of the meeting to pass a resolution of sympathy with his relatives. He asked Mr. Woodall to undertake this duty.

"Mr. Corbet Woodall said it was now five years since Major Dresser attended the first meeting of the (then) British Association of Gas Managers, when he came as a stranger amongst the members, bringing a letter of introduction from Mr. W. King, of Liverpool. Since then they had seen him frequently; and he believed he might say that the circle of his friends had grown almost to the dimensions of the Institute. Major Dresser was very earnest in seeking information, but he was also prepared to "do good" and "to communicate" to those about him any information he might have gathered with reference to matters of mutual interest. They were all proud of him as an honorary member, and he was sure everyone would concur in the following resolution which he begged to move:—'That this meeting desires to record the deep regret with which it has heard of the death of Major G. W. Dresser, of New York, one of the honorary members of the Institute; and tenders to his family the expression of its profound sympathy. Major Dresser had during recent years been associated scarcely less intimately with the gas industry of this country than with that of America; and his varied information (which he was ever ready to share with others), combined with the remarkable charm of his personal character, caused him to be as highly esteemed as he was widely known.'

"Mr. C. Hunt (Birmingham), in seconding the resolution, said he could add nothing of value to what Mr. Woodall had said; but, having had the privilege of sharing the friendship of Major Dresser, he valued the opportunity afforded him of bearing testimony to the esteem in which he was held on this side of the Atlantic. He only heard the previous night of Major Dresser's death, and he then felt that a heavy cloud had gathered over the meeting. Two years ago Major Dresser was at Birmingham, full of health and vigor, and contributed much by his keen and pointed humor and strong common sense to the success of the meeting; whilst his conversational powers and genial manners added greatly to the enjoyment of the hours of relaxation. Of his personal character he (Mr. Hunt) need say but little, except that it was such as to command for him the highest admiration and esteem. In America he labored most successfully to cement unity amongst his professional brethren, and he formed a connecting link between them and those in England; so that both there and in England he would be greatly missed.

"Mr. W. King (Liverpool) supported the resolution. He said that he believed he had known Major Dresser longer than any other member of the Institute; for on visiting America some years ago he was met, on landing at New York, by Major Dresser, and from that moment throughout his visit he received at his hands a remarkable amount of attention and kindness. On Major Dresser visiting England, he had the pleasure of introducing him to many members of the Institute; and he bid him good-bye when he left Liverpool in November last. He was not then in good health, but he still looked forward to the probability of seeing him at the present meeting, and was much grieved to hear of his death. The circumstances of his decease were peculiarly sad, his wife having died only a few weeks previously. It was therefore especially desirable to put on record their sympathy with those who had suffered this double bereavement.

"Mr. George Livesey said that he could not add anything to what had been already spoken, and would therefore content himself by cordially endorsing—in which he felt he should only act as the spokesman of the meeting—everything that had been said. All who had known Major Dresser felt they had lost a warm-hearted friend; and he did not think anything better could be done by the meeting than to send such an expression of sympathy to his family.

"The resolution was then put and carried unanimously; the members all rising to their feet, in silence, as a token of assent."

The Petroleum Outlook.

The daily average production for the month of May has been increased 2,741 barrels. This increase has all come from the middle district, which includes Warren and Forest counties. The output from the Cooper tract and Balltown in Forest county has been increased during the month, notwithstanding a large number of dry holes have been developed.

The production in Allegheny and Bradford field continues to decline, and the same may be said of the lower ditsrict.

From the outlook now, we think the production may be kept up to its present limit during the months of June and July. For the month of August we look for a decided decline in the now known producing fields.

The receipts of crude petroleum from the wells by all the pipe lines, and the deliveries from the pipe lines, do not always show the increase or decrease in the stock. The pipe lines find that there is a constant accumulation of sediment in their tanks, which they make good by purchasing merchantable oil, thereby increasing the runs or receipts, and the surplus and sediment account, without including it in the stock account.

In our April report we showed the receipts from all the pipe lines to be 167,837 barrels more than the deliveries from the lines; also, a decrease in the total stock of 91,849 barrels. By adding these two amounts together we have 259,986 barrels, which went into the sediment and surplus account during the month of April.

Neither do the pipe line runs or receipts from the wells always represent the production, as there is quite a large quantity of oil constantly remaining at the wells, which in some months is drawn upon by the pipe lines, and in some other months a small portion of the production is left at the wells, which increases the quantity.

From the producers' gauge of the well tanks at the close of the month of May compared with their gauges of the same tanks at the close of the previous month, it shows a decrease of well stock during the month of 173,610 barrels, which amount we deduct from the runs and the well stock in making up the production account for the month of May.

The shipments out of the producing region continue large, and the charters heavy.

The new work in the producing region is quite active, but without much change since our last issue.—*Stowell's Petroleum Reporter.*

Gas Once More for San Francisco's Streets.—The Citizens of San Francisco, Cal., once more rejoice in having their streets lighted up at night. Gas was turned on to the street lamps July 1st, and let us hope that it will not be shut off again, and further hope that the city will pay for it.

[Read before the Society of Gas Lighting.]

Some Observations on the Proper Air Supply for the Common Style of Retort Furnaces.

By C. J. R. Humphreys.

In a great many of the papers and articles which have been published of late years on regenerator versus the common style of furnace for retort settings, it has been stated that the drawback to the usual form of furnace is that a vast supply of air has to be admitted to the interior of the bench in order to insure perfect combustion of the fuel; and bewildering calculations are indulged in to show how serious is the effect of the extra quantity of air on the heat of the retorts. Likewise, in the various text-books treating of retort house practice, the law is laid down to the effect that it is necessary to admit from 24 to 36 pounds of air per pound of coke consumed, in lieu of 12 pounds, which is usually assumed to be the theoretical requisite. It seems strange that among these dissertations we do not meet with a single case where the practice of using so large a quantity of air in the common furnace is questioned; not one, as far as our knowledge goes, pauses to inquire whether it is truer economy to admit two or three times the quantity of air which theory demands, and so insure perfect combustion, or to provide a smaller quantity of oxygen per pound of carbon, and run the chance of having some of the coke only partly burned. Though strange, the incident is not altogether inexplicable, because our modern writers, when treating of heating retorts, have been more or less guided in their remarks by noted text-books on heat, and these latter deal almost exclusively with this subject in its relation to steam boilers. Few steam generators are run at a higher pressure than 120 pounds to the square inch; and as the temperature of steam at this point is 350° F., it is safe to say that the intensity of the products of combustion from a boiler fire need not be much over 600° F. In such a case no risk would be run in admitting a large quantity of air to the fuel, because the temperature of the products of combustion will still be considerably above that point. The case with a retort setting is vastly different, for here we have to maintain the vessels at a heat of about 2,100° F. It is therefore clear that the point to be aimed at is to have the products of as high an intensity as possible, it being remembered that all the heat of a lesser degree of intensity than 2,100° is useless for the purpose intended. In a word, then, as you all know, we need to have the products of combustion of a high intensity—quantity being of a secondary consideration. As an example, a hundred ordinary grate fires discharging their fumes into a bench would not carbonize the coal in the retorts.

There would seem, therefore, to be ample excuse for investigating this subject with the avowed purpose of ascertaining whether it would not be more advantageous to use a quantity of air approximating to the amount theoretically required, with the danger of imperfect combustion, rather than being so profuse with the air supply, and thus reducing the intensity of the products of combustion. In a word, in the common furnace for heating retorts, is the perfect combustion being paid for too dearly?

It may be well to note clearly that in the present paper we have nothing to do with improved furnaces, our purpose being to confine our remarks to the common form.

We may pause here to express our regret at not being able to find a record of any experiments which would aid in our endeavor to ascertain the quantity of CO which would be found in the furnace gases when only the quantity of air theoretically necessary is used.

First we will examine the case where the coke is burned under theoretically perfect conditions. We will suppose the coke to contain 7 per cent. of incombustible material; hence 10.80 pounds of air will be required per pound of coke. The .93 pounds of contained carbon will unite with 2.48 pounds of oxygen to form 3.41 pounds of CO_2, liberating 8.32 pounds of N. Hence—

	Pounds.	Specific Heat.	Heat Units.
CO_2.....	3.41	.2164	.7379
N.....	8.32	.2440	2.0400
	11.73		2.7779

heat units will be absorbed in raising the temperature of the products of combustion of one pound of coke one degree Fahrenheit. To ascertain the theoretical heat of combustion of one pound of coke we will take 93 per cent. of 14544 (the heat of combustion of one pound of carbon, according to Favre and Silberman); this will be 13525. Then,

$$\frac{13525}{2.7779} = 4868° \text{ F.},$$

the highest theoretical temperature attainable by the combustion of one pound of coke. If 16.20 pounds of air are used per pound of fuel in lieu of 10.80, then the heat units absorbed in raising the temperature of the products of combustion 1° F. would be—

	Pounds.	Specific Heat.	Heat Units.
CO_2.....	3.41	.2164	.7379
N.....	8.32	.2440	2.0400
Air.....	5.40	.2377	1.2835
	17.13		4.0614

Therefore the temperature of the products will be

$$\frac{13525}{4.0614} = 3329° \text{ F.}$$

If double the quantity of air theoretically required were admitted to the furnace, the heat units absorbed in raising the effluent gases 1° F. would be—

	Pounds.	Specific Heat.	Heat Units.
CO_2.....	3.41	.2164	.7379
N.....	8.32	.2440	2.0400
Air.....	10.80	.2377	2.5671
	22.53		5.3450

Hence the theoretical temperature of the gases will be—

$$\frac{13525}{5.3450} = 2528° \text{ F.}$$

If two and a half times the requisite quantity of air were used, the heat units absorbed would be 6.6286. Thus—

	Pounds.	Specific Heat.	Heat Units.
CO_2.....	3.41	.2164	.7379
N.....	8.32	.2440	2.0400
Air.....	16.20	.2377	3.8507
	27.93		6.6286

And the theoretical temperature of the gases would be—

$$\frac{13525}{6.6286} = 2040° \text{ F.}$$

For the case (and it is by no means an extreme one) where three times too much air is used, the heat units absorbed would be 7.9122. Thus—

	Pounds.	Specific Heat.	Heat Units.
CO_2.....	3.41	.2164	.7379
N.....	8.32	.2440	2.0400
Air.....	21.60	.2377	5.1343
	33.33		7.9122

The temperature of the products would be—

$$\frac{13525}{7.9122} = 1709° \text{ F.}$$

It must be remembered that the foregoing figures would hold good in theory only; no such intensity will be obtained in practice. It may also be stated that the figures arrived at as indicating the temperature of the effluent gases are irrespective of the initial temperature of the air. It is thus clear that at times we run the risk of having our furnaces take the form of abstractors of heat rather than the reverse.

We will now turn our thoughts in the opposite direction from that we have been pursuing, and endeavor to estimate what loss we meet with when, on reducing the supply of air, we have, as the result, imperfect combustion. For a supposition case, we may assume that while admitting 16.20 pounds of air per pound of coke, 10 per cent. of the fuel takes the form of CO. The heat units absorbed in raising the temperature of the effluent gases 1° F. will be arrived at as follows: Having already determined that one pound of coke of the composition indicated will combine with 2.48 pounds of O to form 3.41 pounds of CO_2, it follows that the 90 per cent. of this fuel burning to CO_2 will go with 2.232 pounds of O, making 3.069 pounds of CO_2. One pound of coke will, in conjunction with 1.2369 pounds of O, form 2.1669 pounds of CO. The 10 per cent. of the fuel passing away in this gas will amount to .21669 pounds of CO. We have, then—

	Pounds.	Specific Heat.	Heat Units.
CO_2.....	3.06900	.2164	.6641316
CO.....	.21669	.2479	.0537174
N.....	7.89156	.2440	1.9145406
Air.....	5.95275	.2377	1.4149686
	17.13000		4.0473582

The temperature of the gases will be found by using for a dividend 90 per cent. of 13525, the theoretical heat units of one pound of coke burning to CO_2, plus 10 per cent. of 4141 (93 per cent. of 4453), the like figure when the same coke passes off as CO. That is—

$$\frac{10172 + 414}{4.0473582} = 2615° \text{ F.}$$

The loss in heat units from the 10 per cent. of coke taking the form of CO will be 938 heat units.

We may take as a second supposition case the use of 21.60 pounds of air per pound of fuel, with 5 per cent. of the coke going off as CO. We would then have—

	Pounds.	Specific Heat.	Heat Units.
CO_2.....	3.2395	.2164	.7010278
CO.....	.1083	.2479	.0268475
N.....	8.0997	.2440	1.9764
Air.....	11.0825	.2377	2.6343
	22.5300		5.3385753

The temperature of the gases would be found by dividing the figure just obtained into 95 per cent. of 13525 plus 5 per cent. of 4141. That is—

$$\frac{12850+207}{5.338} = 2446^\circ \text{ F.}$$

The loss in heat units from the 5 per cent. of coke taking the form of CO will be 469 heat units.

With such meager light as the foregoing calculations afford, let us turn to examine the working of a common furnace. A bench of six retorts will carbonize 9,000 pounds of coal per day, allowing for charges of 250 pounds per retort, and four hours as the time for distillation. If we reckon on obtaining 1520 pounds of coke per ton of coal, the weight of this residual resulting from the carbonization of the 9,000 pounds of coal will be—

$$\frac{1520 \times 9000}{2240} = 6107 \text{ pounds.}$$

Presuming 39 per cent. of this to be used in the furnace, we will have a consumption per diem of 2400 pounds nearly, or, on the average, 100 pounds per hour. The weight of fuel burned during each stated period will vary somewhat. It is customary to charge one of these ordinary furnaces with 200 pounds of coke every two hours. Naturally, then, when the fire has just been made up, the rate of consumption will be more tardy than when after the fuel has reached a high state of ignition.

The following table will show what my observations have led me to believe are the proportions of coke consumed during each half hour, as well as the depth of the coke in the furnace at the end of each period:

	Coke Consumed.	Depth of Fuel at end of each Period.
First half hour.....	30 pounds.	20½ inches.
Second "	50 "	18 "
Third "	60 "	15 "
Fourth "	60 "	12 "
	200 pounds.	

Further, the perfection of the combustion will vary somewhat with the depth of the fuel through which the air has to make its way. If the supply of oxygen be more or less restricted, an analysis of the resulting gases made a half hour after the furnace is charged will doubtless show the presence of considerable CO; and when the depth of the fuel is decreased by the combustion of part thereof, this gas, which has been styled the arch enemy of economical heating, will gradually disappear. On the other hand, if the supply of air be more than abundant, we will have approximately perfect combustion, with but little free oxygen at the end of the first half hour; but as the quantity of coke in the furnace diminishes, so will the proportion of oxygen increase, resulting in a lower intensity of the gases. Here, again, are presented the two horns of the dilemma. For my own part, from the theoretical study of the question, as well as from observations made at my works, I am of the opinion that when the dampers are only occasionally regulated, the proper time to make the adjustment is about thirty minutes after the firebox is filled, and they should then be so fixed as to show at the top of the small stacks (such as are in common use in this country) a small flame of CO. If it be attempted to measure the quantity of air entering the furnace, then the adjustment should be so made as to admit about one and a half times the amount theoretically required.

In conclusion, I would endeavor to forestall criticism on one point, by willingly conceding that the calculations in the foregoing, on the effect produced when part of the fuel takes the form of CO, are of limited value, seeing we have not experimental data on which to base our deductions. We must, however remember that the theoretical calculation must often precede the experimental research in order to determine whether the subject be worthy of the latter more laborious method of investigation. All I claim for my remarks is that they would seem to show that labor spent in determining the exact amount of CO produced in a common retort furnace, under the varying conditions of the fire, would bear a plenteous harvest of good fruit.

Electric Light in Savannah, Ga.—It is proposed by the City Council of Savannah, Ga., to light the streets of that city, in a partial manner, by the arc light. It is further proposed to pay for this service the sum of $18,000 per annum. A complete lighting of all the streets by gas lamps could be and is accomplished at cost of about one-half the above-mentioned rate.

[Official Report.—Continued from page 9.]

Sixth Annual Meeting of the Western Gas Association.

Held at the Burnet House, Cincinnati, Ohio, May 9, 10, and 11, 1883.

Second Day—Morning Session—May 10.

Discussion on Mr. J. Gimper's Paper on "Furnaces."

Mr. G. Hyde (Cleveland, O.)—Mr. Gimper speaks of the coke from the two lower retorts as being sufficient. Does he mean by that, that one-third of the coke is sufficient?

Mr. Gimper—Not quite one-third of the coke is used. The lower retorts are charged a little lighter than the middle or top retorts; but sometimes we use one of the middle retorts as the wind up on each shift. We charge bottom retorts with 14 shovels, the middle ones with 17, and the top ones with 21.

Mr. J. M. Starr (Richmond, Ind.)—Do you use the bridge wall?

Mr. Gimper—No.

Mr. Starr—I mean the wall that runs through the bench two or three feet from the back end?

Mr. Gimper—No; it is the usual open setting with self-supporting arches.

Mr. Starr—What is the size of your grate bars?

Mr. Gimper—Two feet by three.

Mr. Starr—How often do you clinker?

Mr. Gimper—Once a week we clean the furnaces out entirely. The men now attend to the furnaces, with the present consumption, about once or twice in the twelve hours.

Mr. Starr—How far are your grate bars above the top of your ash-pan?

Mr. Gimper—They are very close down to the ash-pan. There is just enough room to clean out the ash-pan properly.

Mr. Starr—Do you have to take out your grate bars to get the ashes out?

Mr. Gimper—Yes; but only twice or three times in twenty-four hours.

Mr. Starr—I have had some experience myself with furnaces of that kind. I have built what I intended to be a regeneration furnace. My grate bars are 15 inches by 3 feet. My experience with regeneration has not been as satisfactory as I would wish it to be. I have listened with a great deal of pleasure to the remarks made here, and hope to learn something from them. I want to learn how to succeed in this matter.

Mr. Gimper—In reply to Mr. Starr, I will say that the experience of all who have used the regenerator or recuperator furnace has been varied. Some have had good results—others have not. During the first month or two that I used it I was puzzled considerably, but after getting the hang of it found it an excellent thing. If we derived no other advantage from its use than the saving of labor we should think the change worth making. I use either the regenerator or recuperator system of flues. Since I started the recuperator I have not gone back to the regenerator at all. The clinkering is a very simple affair. We find it a very great saving in labor, as it is so much easier to keep up a uniform heat, providing you are careful with everything.

Mr. T. Smith (Grand Rapids, Mich.)—Do you take the draught from the bottom of the grate bars, or do you take a portion from the air flues?

Mr. Gimper—I take the draught from both places. In the door there is a slide provided for the regulation of the air which is admitted under the fuel; this slide is 3 by 4 inches in size, and is open an inch or an inch and a half, according to the heat we want to carry. That is all the air admitted under the grate bars. The supplementary air comes in from the side.

Mr. Smith—How large a place have you for your flues; 3 or 4 inches square?

Mr. Gimper—No; the supplementary air is admitted at different nostrils on each side.

Mr. Smith—And some have a hole 4 inches square, and others have it reduced down to 2 inches square?

Mr. Gimper—The first hole, nearest to where the air comes in, is the smallest, the next is larger, the third a little larger still, and the last one the largest. If the first were as large as the last most of the air would pass at that point. Those nostrils are not directly opposite each other, so that the currents do not come directly together.

Mr. Smith—How many jets of steam have you under the grate bars?

Mr. Gimper—One.

Mr. Smith—Where is that placed?

Mr. Gimper—Somewhere near the door. It passes through the brickwork and divides itself at once under the whole grate surface.

Mr. J. W. Dunbar (New Albany, Ind.)—How often do you find it necessary to clinker?

Mr. Gimper—Once or twice in twelve hours; we do not clinker; we only loosen the clinker. We really clinker the furnace once a week.

Mr. Dunbar—It seems to me that the firing up of the furnace, without clinkering, is only a very small proportion of the work that a man does in the twelve hours.

Mr. Gimper—That may be true with the coal you use; with our coal it requires a large amount of such work.

Mr. Dunbar—Our furnaces are cleaned out and clinkered once every twenty-four hours.

Mr. Gimper—In our old style of furnace we had to fire every hour, and to handle a certain amount of ashes. If all that work has to be done every hour it is very hard on the laborers.

Mr. E. J. King (Jacksonville, Ill.)—I would like to ask Mr. Gimper whether, for small gas works not able to afford a foreman for each department, to manage the furnace, he would feel safe in leaving the management in the hands of the average stoker. Also, whether he has had the furnace under fire a sufficient length of time to compare the life of the retort under this heat with the life of a retort under the old system. That should be taken as a factor in deciding the question of economy.

Mr. Gimper—I will say in answer to Mr. King, that, as far as the size of works is concerned, where you have not a foreman, I think you can safely leave that furnace to the care of an ordinary stoker. I have no foreman. Our works are perhaps as small as any represented here. I have only ordinary firemen, and leave it all to them. So far as the life of the retort is concerned, I am not prepared to speak; we are only working since last November; but I anticipate a much longer life to the retort than we had with the old style, because of not having so much fluctuation in heat.

Mr. E. L. Brown (Chicago, Ill.)—What is the object of so deep a cellar?

Mr. Gimper—To get the necessary depth of fuel and depth of furnace. If I had not been afraid of water, I should have gone two feet deeper. I would always go just as far as I could.

Mr. King—Did you have any trouble with stoppages in the flues and stand pipes?

Mr. Gimper—We have had a little stoppage in the stand pipes, but I do not know that we have had any more than when we had good high heats under the old style. The only trouble I have not yet been able to overcome is that underneath the stand pipe of my top retorts, and in the hydraulic main, a pitch forms. I rather think it can be obviated by setting the main higher, and extending the pipes. I only find it under the top stand pipes. Under the middle or lower stand pipes there is not so much.

Mr. King—Could this furnace be adapted to works which are unfortunately on so low a level that they cannot be carried down on account of the water? I have understood that, in this regenerator furnace, they were sometimes set to one side of the house. Could that form be adopted for your setting?

Mr. Gimper—I do not know whether it could or not. I believe in having the furnace directly under the arches. If you take the Dieterich furnace you can set it to one side, and there are other regenerator furnaces which you can set to one side, or back, or forward. I have not given any thought to that with regard to this particular style of furnace.

AUDITING COMMITTEE.

Messrs. King and Burns were appointed by the President a committee to examine and audit the accounts of the Treasurer.

Mr. J. Somerville (Indianapolis, Ind.) read the following paper on

SOME OBSERVATIONS ON THE SPECIFIC GRAVITY OF GAS.

It has been my daily practice for some years to take the specific gravity of the gas and to keep a record of the same. I have thought that a few observations on the changes that occur in the specific gravity would be interesting and perhaps instructive to you. The operation is very simple, and requires but little time. I usually do it while the candle is burning preparatory to taking the illuminating power, a daily record of which I also keep. I employ the usual method of exhausting the air or gas from a perfectly air-tight glass globe, which in this state is balanced on a very sensitive balance. The globe is then filled with air and weighed; then it is filled with gas and weighed. A simple calculation, dividing the weight of the gas by that of the air, gives us the specific gravity. The air and gas is first passed through a tube containing chloride of calcium to free it from mixture. It is not necessary to exhaust the globe every day only when there has been a decided change in the temperature of the atmosphere.

You will readily perceive that by making a daily experiment of this kind any change or fluctuation in the manufacture of the gas is quickly and knowingly ascertained. Any variation in the temperature of the retorts, any change in the washing and condensing apparatus, is immediately shown when the gas is placed on the scales. Thus, if the temperature of the retorts increases, the specific gravity of the gas invariably decreases. This shows to me that I am burning up and destroying the light oily naphthas which are heavy and rich illuminants. If I use cannel to enrich, I find the specific gravity increases, for by doing this I am restoring to the gas the rich hydrocarbons which I have previously taken out of it. But I have long since come to the conclusion that there is no economy in so doing.

I have observed also that over-washing or condensing produces the same results on the specific gravity as over-heating. These rich hydrocarbons have to be tenderly dealt with; sudden cooling is fatal to them, neither will they stand the cold. I attach great importance to the necessity of keeping these light naphthas in the gas, for I find they act as a lubricant to the whole works. If they are taken out of the gas I have friction immediately in stopped stand pipes, in a diminution of the illuminating power, and some trouble from naphthaline; moreover, by retaining them I can do without cannel. I find I retain them best when I keep the gas from 6° to 8° above that of the atmosphere before it goes to the purifiers.

I have found the practice of daily taking the specific gravity very useful in detecting the presence of air or furnace gas. Let me give you an instance which occurred lately. On putting the globe on the scales I observed a very decided increase of the specific gravity from 405 to 425, and with a decrease in the illuminating power. There being no change in the manufacture, I could only conclude that something had gone wrong. I looked at the exhaust gauge, which I found at the proper point; but a closer examination showed that the gauge was not working right, and we were actually running rather a heavy vacuum, and it was this which caused the scales to tilt so decidedly.

Turning now from the manufacture to the distribution, it is interesting to observe how the variations of the temperature affect the specific gravity. As the cold weather increases the specific gravity of the gas decreases; it will fall from 415 to 370 in winter, when the frost reaches the mains. This decrease is no doubt caused by the condensation of the heavy hydrocarbons which fall to the bottom of the pipes or adhere to the sides, for I am of the opinion they are not lost, but only deposited for a time; and although the consumer suffers a diminution of the illuminating power in winter, yet as the warm weather approaches these hydrocarbons are all gathered up again and carried to the consumer's burners; for I have found, as the temperature increases in the summer, so does the specific gravity—not by any change in the manufacture, but by the gas licking up, as it were, the oily illuminants deposited during the winter; and this will perhaps explain also why naphthaline becomes most troublesome in the fall. It is because the warm gas has taken up every particle of oily hydrocarbon and cleaned the mains and surfaces perfectly dry, so that there is nothing in them to prevent the formation of these interesting crystals with which most of us have been from time to time so familiar.

Before concluding, I wish to relate to you an experiment I made a few days ago with this glass globe which I have already mentioned to you. The globe, you will understand, is as tight as human ingenuity can make it; indeed, it must be tight to be exhausted of its contents by the air-pump. Wishing to see what change would take place in the specific gravity of the gas, I allowed it to remain upon the scales forty-eight hours. The weight of the gas in the globe at the beginning of the experiment was 12.7 grains; specific gravity, 409. In two hours the weight had increased to 13.9 grains. After this the desire of the gas and air to change places gradually decreased until the end of the experiment, when the weight of the contents of the globe had increased to 18.3 grains, specific gravity, 590. You will observe from this experiment that however tight our mains and service pipes may be, some leakage will occur, and that the lighter the gas the greater is its desire to escape; but the reverse is the case with a heavy gas.

A lengthy discussion here ensued upon the paper read by Mr. Somerville, the principal participants in which were Messrs. S. H. Douglas, T. G. Lansden, T. Smith, J. M. Starr, G. A. Hyde, R. T. Coverdale, H. Pratt, E. J. King and James Somerville.

THE NEXT PLACE OF MEETING.

Mr. Spencer—The committee appointed to name the next place of meeting recommend that the next annual meeting of the Association be held in the city of St. Louis, Mo.

The report was accepted and the recommendation adopted. The President then appointed the following gentlemen to serve as a Committee of Arrangements for the St. Louis meeting: Messrs. T. G. Lansden, J. C. Zabriskie and A. W. Littleton.

SMOKE BURNERS.

Mr. E. L. Brown (Chicago, Ill.)—It is now twenty minutes to eleven, and I presume there will be no more papers read this morning. It may possibly interest the Association if I describe to them a smoke burner which I use under my steam boilers. I presume that all large gas works are interested in the production of steam as well as in the production of gas. I have the only successful smoke burner in use in the city of Chicago. We have an ordinance there to the effect that there shall be no smoke thrown out of the chimneys, and one or two men are fined every day because of the smoke which issues from the chimneys of their factories. I will state, in the commencement, that I am in no way interested in this burner. I bought and paid for it, and have no further pecuniary interest in it. It has been in use since the spring of 1872. Ordinarily, in passing by my place, you would think the works were not running, if you were to judge alone by the absence of smoke at the chimney. My boiler is 12 by 46; it rates at 40 horse power. I run an 80 horse power engine full up. I heat two stories of my factory, which is an old wooden building, 80 by 106. I furnish power for

my iron business and for my sand blast. In addition to heating my own building I heat a drying-house, and furnish power to run a large furniture factory. I also run a foundry and a large polishing works. All this is done from the one boiler. I do it with two-thirds of a ton of common Illinois screenings per day, the year round. I calculate that I have saved $5,000 in ten years, by the use of that burner. It is the simplest thing imaginable. It is constructed upon the only correct principle. Many different burners have been tried and abandoned in Chicago, and this one is now being adopted. I will try to describe it. It is a tubular boiler. The heat comes from the back of the boiler, passes out and goes up the chimney. Across the back end of the chimney is what we call the mud drum, running across the boiler, and is 16 to 18 inches in diameter. Across the front end of the boiler there is another drum of the same size, made of the best fire-box iron, ⅜ inch thick, the boiler being 5-16. That runs right across from the brick wall. They are both connected by a neck running up into the boiler in the usual way. It is about 2½ feet from the front end of the boiler. There are those two mud drums running across, one at the front end and the other at the back end. Those two are connected together at the front end by a 4-inch pipe. I had trouble with the pipe at first because I did not put in a slot joint to allow for contraction and expansion. The top of the front mud drum is bricked up with fire-brick solid from the bottom of the boiler, so that all the combustion has to go under the first drum. The fire-grate is placed at an angle of 45°, and runs down under the centre of the first drum, and from there it runs back 2½ feet on a straight line, level, where it meets the fire wall, which turns the heat up against the boiler. This runs down 8 inches from this grate to this front drum. It is one of the most beautiful things you ever saw. We simply fill the front with coal right up to the drum. We shut the top doors, above the fire, and we open the others a little. In the front box the coal cokes. The gases are formed in there, and are drawn through the white hot fire. I have a place through my brick wall, over the level grate, where I can look in and see the fire; and there is a stream of gas which comes up just as if it were blown out of a blow pipe, and strikes directly behind this boiler. There is not a boiler in Chicago of twice the size which does more work than mine. It simply makes the gas and burns it; and the gas has to be drawn through the coal to be consumed. Ordinarily you can see no smoke in our chimney. The men do not have to clean out the flues oftener than once a week. There is nothing to clean out. If the smoke is burned there is nothing deposited.

Mr. J. M. Starr (Richmond, Ind.)—Is it a patented device?

Mr. Brown—Yes; it is called the Woodson patent; but I cannot find out where the patentee is. If I owned the patent I could make a fortune out of it. In my judgment, it is the only correct principle. All kinds of experiments have been tried, in Chicago, for the purpose of consuming smoke, but nothing else has worked so well as this.

Mr. Starr—What do you estimate the cost of putting it in for use with an ordinary boiler?

Mr. Brown—When I had mine put in, Mr. Gates, of Chicago, had the right to put them in. I paid him $300, which gave him a very handsome profit. I think that $150 would put it in very easily. The principle is philosophical, and correct; it cannot help working year in and year out.

Mr. Starr—Does it require more than an ordinary draught?

Mr. Brown—No; I have a 65 feet chimney, and about 2 feet 8 inches square. Mine is the only one now in Chicago. Other people are going to put them in. I have told people all these years that I had it, but it has not, until recently, attracted much attention. Three or four months ago one of the newspaper men came out and said that the more smoke burners they put up in Chicago the more smoke came from the chimneys, and ended by asking the question, "Is there a smoke burner in Chicago which is a success?" I wrote to the editor that I had one which I thought was a success, but had no pecuniary interest in introducing it. The *Tribune* then sent over, examined, and made a diagram of it, publishing the same; since then it has attracted very much attention. Had I thought of it, I would have described it years ago.

Mr. G. G. Ramsdell (Vincennes, Ind.)—How would that burner operate in connection with a boiler requiring only a moderate quantity of steam?

Mr. Brown—It would make no difference. If I were making a new boiler, I should modify it in this way. Instead of making the drum as I spoke of, I should run it right down from the boiler, making it all in one piece, wide at the boiler, and running down to narrow point. I think that would be better than putting the brick in. We have the mud drum to catch the impurities. With our water we have a deposit of lime, and we have a skimmer on the boiler, which is shaped like a large open-mouthed funnel, its center being opposite the water line; once a day I turn the stopcock in the pipe, and skim off the surface of the water.

Mr. Starr—Does not your smoke burner amount to a base burner?

Mr. Brown—It is substantially the same principle.

On motion of Mr. Cosgrove the thanks of the Association were tendered to Messrs. Gimper and Somerville for the interesting papers read by them.

The convention then adjourned to 7:30 P. M.

SECOND DAY—EVENING SESSION—MAY 10.

The Association met at 7:30 P.M.

Mr. Geo. Shepard Page (New York)—There is a matter of business which, it appears to me, is important that we should consider to-night. I was quite surprised to learn that the committee to which was referred the paper by Mr. Ramsdell, on "State Organization," was requested to report to the Association a year hence, instead of reporting to this meeting. It seems to me, in looking over the field of attack upon the coal gas interests, that many millions of dollars may be sacrificed during the coming year, unless some plan can be arranged within the next few weeks by which concerted action may be taken by the gas companies to ward off the attacks against our industry. I move to reconsider the vote by which that committee was instructed to report a year hence, in order that they may be instructed to report, at the meeting to-morrow, some plan of action which may be put into motion within the next ten days.

The President—The remarks of Mr. Page are very pertinent. I will state that the committee intend to meet this evening, in company with General Hickenlooper, to prepare some plan of action, and that they will report upon it to-morrow morning. I will, however, put the motion of Mr. Page.

The discussion on this subject now became general; and after the views of the members had been pretty thoroughly ventilated, the result reached was that the motion of Mr. Page was withdrawn, with the consent of the Association. On motion of Mr. Spencer, the Association then adjourned to meet the following day at 9 A.M.

THIRD DAY—MORNING SESSION—MAY 11.

The Association met at 9 o'clock A.M.

Mr. T. Smith (Grand Rapids, Mich.) read the following paper on

ELECTRIC LIGHTING.

Our Secretary having requested me to say a few words concerning the electric lighting of Grand Rapids, Mich., I have here a few jottings which may be of interest to the members of the convention. In Grand Rapids we have two electric light companies. The Grand Rapids Electric Light Company started two years ago, with 33 store lights and 11 street lamps, at a charge of $186 per year for each light. This company employs water power for generating electricity, and uses the Brush light.

The Michigan Iron Works Electric Light Company started operations about a year ago, using steam power for generating electricity. They have now in use about 160 lights and 21 street lamps, which include the 11 street lamps formerly lighted by the first company. They charge for the store lights from $85 to $100 for each light, according to length of time in use, which is from dark to 10 or 11 o'clock, according to agreement. The 21 street lamps burn all night, at a cost of $95 per light per annum. This company started with the Fuller arc light, but are now using both the Fuller and Brush lights. They now propose to increase their capital stock, and introduce the Swan incandescent light, with the Brush storage battery; their terms to be $10 per year for single lights; and, where five lights are used, they will furnish meter and storage battery free of charge, with a promise that the cost will not exceed the price of gas for the corresponding month of the previous year.

The first company is now proposing to use the Maxim incandescent light, and will supply electricity at the rate of $1.50 per month for each light, or $18 per year, consumers paying for their own lamps.

As to the effect of the electric light system on the consumption of gas, I can only say that our consumption keeps steadily increasing; and that last year our increase was 3½ million feet over the preceding year. Supplying as we do good gas, from 18 to 20 candle power, at $2 per thousand, we can hold our own with the electric light, and confidently look forward to a steady increase in the future as we have done in the past.

I may add that our increase since the first of January has been 1,200,000 feet over what it was last year. The electric light company bound the people to use the light for one year; but as soon as the year was up many discontinued it. I think that from 12 to 14 lights have been taken from the inside of stores, and but one light retained on the outside as an advertisement. I think our consumption of gas will be largely increased the coming year because of the discontinuance of electric lights.

Discussion.

Mr. J. W. Dunbar (New Albany, Ind.)—Do you say that the Swan light is furnished for $1.50 per month?

Mr. Smith—The Swan incandescent light is furnished for $10 per year; and they propose to give the Maxim light for $1.50 per month, or $18 per year.

Mr. Dunbar—How long are consumers allowed to burn the $1.50 light?

Mr. Smith—As long as they choose. I think there is some stipulation about time, but I do not know what it is.

Mr. Dunbar—What candle power will that one light give?

Mr. Smith—I cannot say as to the Swan light; but I have noticed the 24

Maxim lights, and I should think that five or six gas burners would give as much light as the 24.

Mr. Dunbar—That would be about five electric lights to one 5-foot gas burner. Did you say that a 5-foot burner would give as much light as their 24 lamps?

Mr. Smith—No, not quite that; I should think that three good burners would give as much as their six burners.

Mr. Dunbar—Then, if that is the case, the electric light is very nearly as cheap as gas.

Mr. Smedberg—I would like to ask you, Mr. Smith, whether, in Grand Rapids or in any other town where they have attempted this electrical sensation, you, as a stockholder, can get genuine dividends out of the electric light. As a manager, my first duty is to make money for my stockholders. Do these fellows make any money?

Mr. Smith—I do not think they do.

Mr. J. M. Starr (Richmond, Ind.)—I think that Mr. Dunbar is mistaken about the electric light being cheaper. Mr. Smith says that he takes 24 burners at $10 per year; that is $240 per year.

Mr. Smith—At the present time I think 24 of them would cost $360. Their present rates are $1 per month. We can put in the light for one-half the money.

Mr. Starr—Five 6-feet burners would give the same light; so that the electric light is the more expensive.

Mr. E. L. Brown (Chicago, Ill.)—There is another consideration which you do not take account of, and that is the great cost of the lamps. A friend of mine in Chicago, who has a large drug store, wanted to figure it up, and was thinking of lighting his store with an incandescent light. He found that the light itself was cheap enough; but when he learned how many lamps he would break and use, he decided that the lamps cost more than the light itself.

Mr. Starr—I made some inquiries at the drug store of Caswell, Hazzard & Co., in New York city, about a year ago. I happened along there one evening when the electrician was replacing the burners. I saw a lot of them on the showcase, and asked him how long those run. He said they would run various lengths of time—sometimes two or three days, and sometimes a month, perhaps longer. He had seven lying there which were taken out that evening. He had a statement of the length of time they had run; one had run two days, another had run twenty dsys; but not one of them had been running longer than twenty days. The expense of the lamps is greater than the cost of gas. I am informed that those lights have since been taken out of that store. The Maxim lamp costs $2.50, as I have understood.

Mr. T. G. Lansden (St. Louis, Mo.)—I had the pleasure, a few years ago, of visiting one of the largest establishments of the kind in the United States where the incandescent light was being used. I spent two days with the engineer who was managing the machinery. I told him that I had come from the West, and was interested in the success of the electric light. He immediately took up with the idea that I was not a gas man. I spent two days with him learning what I could about the light. Then I told him that I was going back West, and I asked him what I should say to my folks. "Is this thing reliable, and a perfect success in every way?" He said, "Yes; I have been four years about this institution; and you can tell your folks not to be afraid of it. It is a perfect success." I then said, "I have been with you for two days, and I notice that you have eight gas burners in your room. Why have you not turned out your gas?" He asked, "Are you a gas man?" I answered, "Yes; but I am interested in the success of the incandescent electric light." In the areaway, back of the building, I found two large hogsheads of broken lamps. I asked him how long it took him to fill those barrels; but he would not tell me. There are not glass blowers enough in the city of New York to supply that city with incandescent lamps. I found there three hogsheads well filled with broken lamps; but I did not learn how long it had taken to accumulate them.

Mr. T. A. Cosgrove (Evanston, Ind.)—I suppose that was the reason for retaining the gas light.

Mr. Lansden—He said that the gas was a good thing to have on hand. I told him I had noticed that.

The President—I was at New Orleans last February, and, as a matter of course, called upon the gas company, and met Mr. Carroll, the superintendent of the works. I said to him, "Mr. Carroll, you have a large amount of electric lighting in New Orleans—more than any other city I have been in. How is your consumption affected by so much electric lighting?" He replied, "I would like to see double the quantity of electric lighting, if our consumption continues to increase in the same ratio that it has with the lights already in."

Mr. Brown—Is there any one here who visited Europe last year? I had that pleasure, and it seemed to me that the use of the electric light in London, in Paris, and in other cities was not nearly so great as it is in our American cities. I would like to know if the fact appeared the same to any one else. It seems to me that in New York, Chicago, and Boston the electric light is more generally in use than it is in any of the larger cities of Europe. I had supposed the contrary to be the case.

Mr. Dunbar—Mr. President, how did the price of the incandescent lighting in New Orleans compare with the cost of lighting by gas?

The President—I did not ascertain that. The only incandescent lighting in New Orleans was at the St. Charles Hotel, and was only used during a certain period of the evening. They had the arc light also. The incandescent light was in the office and dining-room. In the dining room they had gas as well as the incandescent burners. The difference in the illuminating power, as between the incandescent burners and the gas burners, was very perceptible. I noticed, on the side walls, that the shadow given by the incandescent burners, over and above that given by the gas burners, was very great indeed, and largely in favor of gas.

Mr. Smedberg—I am very sorry indeed that Mr. Fay, of the Denver works, is not here. The history of electric lighting there is quite interesting. In February of last year, while passing the interval between two trains in that city, I spent the time from 9 o'clock until 3 the next morning with him, partly in his office and partly in roaming around and looking at the electric lights. He and I went all over the town. He said that the Bray burners had knocked the electric light higher than a kite. He had five 80-candle burners in one lantern, and the effect was very fine indeed. As we were walking about in the early part of the night I noticed here and there patches of absolute darkness. There was a great big series of six jets on top of the Union Depot; only three of them were lighted. I asked him how that was. He said that in that high, dry air there were times when they could scarcely get a single one to burn in the whole town. The great stress which he laid upon the whole matter was this—that if there were plenty of those Bray burners introduced there was no earthly chance for the general adoption of the electric light. Now, in regard to those burners; about six months ago I sent for a few samples, and I went round to two or three stores where a perfect blaze of light in the show windows was desired, and put in several, of from 30 to 80 candles; and since then we have sold many of those burners in our town.

Mr. L. K. Schofield (Fort Scott, Kan.)—Being in Kansas City two weeks ago, and observing quite an amount of electric lighting there, I took one or two evenings to look round and examine the electric light. While doing so I made it my business to inquire as to its cost in comparison with gas. I found it to be the universal expression that parties were compelled to use the electric light because their neighbors put it in. They said, "Our neighbors put it in to advertise their stores, and if we do not put it in the people will go to our neighbors." The cost was about three times as great as that of gas. This was universally admitted. Gas would have answered every purpose, and the people were perfectly satisfied with it. That is the information I got at Kansas City. All these little straws give evidence as to the cost of electricity as compared with gas. I think we need have no fears of competition with the electric light. The novelty of the thing is what shoves it forward at present. It will be but a short time before parties who are now paying thousands of dollars per year for electricity, when they can obtain the same light from gas for $500, will become convinced that it is not economy to use the electric light.

Mr. Lansden—I will give a little experience which I have had with the arc light. We have a large carbon manufacturer in St. Louis. He sends his carbons down to me and I burn them for him in my gas retorts. I have made carbons from every conceivable material. I have assisted him in every way I could, and I will do the same for any electric light institution which will come where I am, because wherever the electric light is introduced our business is increased.

Mr. G. A. Hyde (Cleveland, Ohio)—At Cleveland, a few months ago, the city auditor authorized the publication in the newspapers of the cost of electric lighting as compared with gas lighting. The mast lights cost considerably more than four times as much as the street lamps which the masts displaced; and the lower lights, on Euclid avenue, which stand about 16 feet high, cost a trifle less than three times as much. The city council, a few months ago, concluded that it was too expensive to light Euclid avenue with the electric light, and declined to pay more than half as much as they had been paying. So one-half the electric lights on Euclid avenue were discontinued. The Mayor, in a message, stated that he was opposed to having the city pay any greater sum for the electric light than they had been paying for gas. They have now reduced the electric lights to one-half the number, and I think it is possible that they may be put out altogether. Even now they cost nearly double what gas light would cost.

Mr. J. Gimper (Leavenworth, Kan.)—From the gist ot this conversation I should infer that you all thought the electric light did not amount to much, if anything. We have some electric lights in our town, and there is no denying the fact that they are there furnishing a good and cheap light. I thought, until Mr. Smith spoke, that we had the cheapest light that I had heard of. I do not agree with him that it is used for the sake of the novelty only. I

do not believe that the electric light will ever go out. We live in a progressive age. The people like the electric light, and will have it, We have more indoor lights now than we had three months ago. We have more interior than exterior lights, I believe that good and cheap gas is the only thing to compete successfully with electricity.

Mr. Starr—How long have the electric lights been there?

Mr. Gimper—Since the first of this year. They do not bind the people to use them for more than a month at a time. The price there was $16.50 per month; but now they have come down to $10 per month for the arc light.

Mr. Smith—That is $120 per year. I will sell gas cheaper, if parties will take it for a whole year instead of for a month.

Mr. H. Harthan (Selma, Ala.)—I would like to hear from Mr. Foster, of Montgomery, in regard to this matter of electric lighting.

Mr. T. G. Foster (Montgomery, Ala.)—I have listened with a great deal of pleasure to the conversation about electric lighting. I find that the experience of the gentlemen who have preceded me is very much like my own. The Brush Electric Lighting Company, formed in our town under the Brush patent, has a 40-light machine. They have about 25 private lights in the city, and they are making an effort to light the streets with 23 electric lights. I believe they propose to put them on separate poles, and not masts. The city council still hangs fire. The difference in cost between lighting with electricity and gas would be pretty nearly double. My recollection is that our estimate for gas was $3,000, while the cost of the 23 electric lights would be $5,027. The people got rather enthusiastic about it, because it was something new. Our company adopted the policy of inactivity, and concluded not to make any fight against it. We thought it was best that the people should learn by experience. Our citizens have asked me several times why we did not fight the electric light. I told them that it was not worth the trouble; that they could try it if they desired. The matter is still undecided. I believe the council was to have a meeting to-day to decide the question. Our experience is that we have not lost much by the electric light. We lost one or two large customers, who were paying us $150 per month in the winter months, and these men are really the ones who are behind the whole electric lighting. One of the men is a whole electric light company all by himself; consequently he has cut down his gas bill considerably. Outside of that we have not suffered to any great extent. We have a large store there which had ten or twelve burners in it, and one burner in each window. They now have an electric light in the front window, and use the gas burners inside in addition. There was a very good story told on one of my directors the other day. A gentleman asked him how the electric light was. He said "All right." "Are you not afraid of it?" "No." "Does it not interfere with your business?" "No; not materially." "Well," said the gentleman, "I should not think it would, for my gas bill is the same this month as it was last, and I have been using electricity the whole month." [Laughter.] All the electric light consumers there have made a contract for a year; and I am satisfied that at the end of the year every one of them will come back to the gas company. The electric company make a contract with business houses at $19 per month for one burner, for the business nights of the month—not burning Sunday nights. I know a gentleman whose bill for gas had not averaged him more than $10 per month, who is now paying $19 for electricity; and I am getting from $3.50 to $5 per month from him in addition, because he has to have gas back in his office, where he does his correspondence and keeps his books. He cannot use the electric light for writing. During the summer time, commencing about the first of June, our merchants shut up at about six o'clock in the evening, excepting on Saturday evenings. When they commence closing at six o'clock in the evenings, and only use the electric light four nights in the month, they will find that paying $19 per month for the electric light is not the best economy. I am satisfied that they will then conclude that it does not pay. We are resting quietly in the hope and expectation that after the end of the first year all those who are now using the electric light will come back to the gas company; and then we propose to take care not to let them go away again.

Mr. Gimper—I would not like to be understood, by any means, as saying that we are afraid of being whipped by the electric light company. Not at all. We shall fight them; but we shall only do it by furnishing good and cheap gas. This is the only way to successfully compete with them. With us, the electric light company run their prices on a sliding scale; they reduce the price in the summer months, and increase it in the winter.

Mr. E. McMillin (Ironton, Ohio.)—I live in a town where there is quite a number of manufacturing establishments which cannot be reached by the gas company. Those establishments joined in a call to the Brush Company to send an agent down there to figure on the cost of electric lighting. The agent came and spent a week in making calculations as to the cost of the plant, etc., and the proposition was made that each manufacturing establishment should take stock in the company to be formed for the purpose of furnishing the light, in proportion to the number of lights which they would use. That being the arrangement, it did not much matter what price was charged, whether 25 cents or $1 per night. But, when the arrangement was about completed, several of the merchants asked that they might be furnished with the electric light; and then the question arose, What shall the charges be? From the information gained from other places, it was determined to let them have the light for 50 cents per night. After Mr. Curtis, the agent of the Brush Company, had heard the discussion going on for some time, he said to us that no electric light company that he knew of ever held its own in selling lights for less than 75 cents per night; and that he had never known of but two companies to pay dividends, and they had sold the light at $1 per night.

Mr. S. H. Douglas (Ann Arbor, Mich.)—It seems to me that one thing has been lost sight of with regard to the relative cost of electric and gas lighting. If you will consult the authorities on the question of the convertibility of forces you will find that there are certain simple principles which apply to the electric light. To illustrate—if I raise a ball, 50 pounds in weight, 50 feet high, by means of a large drum, it will produce a certain amount of heat. The gravity force is converted into calorific force. That may be converted into electric force, and the electric force back into calorific force, and that back into gravity force. This is the well established doctrine of the convertibility of forces. Now, apply this principle to the generation of the electric light. We convert gravity into the calorific force by burning our fuel under the boiler. First we have the gravity force, which is the force that drives the engine. That is converted into caloric at the point where two carbon points meet. Now, if this doctrine of the convertibility of forces is true, a certain amount of fuel will produce a certain amount of caloric. That is, the caloric which is generated by the combustion of fuel under the boiler will be transmitted by caloric force to the point of the carbons, and it will there be converted back into caloric. The intense force exerted between the carbon points is simply the heat of the combustion of the fuel under the boiler, less the resistance upon the wires to the passage of the electric current. Now, if this is true, (and there is no question about its being true) there is nothing gained by this transmission of force; on the contrary much is lost. There is a loss by reason of the friction of engine; there is a loss by radiation of caloric in the engine and boiler; and there is a loss again, which is very large, in the resistance to be overcome in the transmission of the electric force over the wires. You cannot convey electricity without having a power behind it. This power is consumed and lost. So much of the force which is generated in the boiler is lost in the resistance on the wire. Every mechanic and machinist knows that the simpler a piece of machinery can be constructed, the better it will be, and the more economically it will work. For example, there is no better way of raising a 50 pound weight in the air than by applying the force in such a manner as to lift it directly. The power may be made more available by the interposition of pulleys, but there is a loss of power attending the introduction of the pulleys by reason of the friction. So it is in every form of mechanism. The simpler it is made the better, and the less expenditure and loss of power there will be. We may apply this principle to the generation of the electric light. I will guarantee that I can demonstrate to any man in one hour that I can produce more light from the gas that is used under the boiler to produce the power used in electric lighting, than can be given by the electric light which is produced. That this is so, is susceptible of practical demonstration. If this be so, then the electric light is vastly more expensive than gas. You will recollect that, in the early history of electricity as an illuminating agent, it was said that to manufacturing companies the light would cost nothing. It was said to men who had engines which were used for running machinery, "Hitch on the electric machine to your power and you can light your establishment for nothing." But what has been the experience of men who have tried the experiment; Take, for instance, the lumbering country in your own State. The owners of large lumber mills were told that they could attach electric machines to the power which ran their mills, and could thus light their mills and their yards, and could run at night without extra expense for light. Many of them tried the experiment; but they soon learned that they must either stop running their saw-mill machinery or stop running their electric lights. They learned that they could not run both with the same power. This has been the result whenever the experiment has been tried. Whenever parties have introduced the electric light, with the expectation that their other machinery would run the electric light, they have been disappointed. This has been true in every case. They have been obliged to introduce new engines. They have been obliged to use engines to furnish the electric light alone. The same engine would not do double duty. This is only confirmatory of what I said at the start, that a large amount of power is consumed in the generation of the electric light, and that this power is made at the expense of the combustion of the fuel. If you can use water power, that is another thing. I speak only of the power as generated by the use of the steam engine. Many years ago a gentleman from the Lake Superior region came to me for advice. I could see at once that he was a genius and a dreamy sort of man. This was long long before the electric light was thought of. He said to me, "I came to get some advice from you. I have been reading different books upon convertibility of forces, and I am satisfied

that there is a grand field here for useful experiment. I want you to assist me in carrying out my ideas, and to direct me in my reading. I want to stay with you for months, or for years, if necessary, to accomplish my object." Said I, "Very well; I will hear what you have to say, and will see what I can do for you." He said, "Here at Niagara Falls is an immense water power, an immense gravity force; there is no limit to it. Now we are told by all the books, and this is undoubtedly true, that gravity force can be converted into electric force, and that the electric force can be converted back again into gravity force. This is the acknowledged truth, as I understand it. Now, let us apply it. If you will help me in my investigation in this direction, I will furnish the money and divide the profits with you." He was a wealthy man, and I assented to that arrangement. Said he, "I propose to take hold of Niagara Falls, where there is an immense and unlimited power, and to use that gravity force. I propose to convert it into electric force, and to carry it on cables all over New York and New England, and to drop it here and there, converting it back into power, and sell the power at different points where it may be needed to drive manufacturing establishments, etc." His theory was correct. There was the fact of the convertibilty of forces. This gentleman was not so dreamy after all. His theory was all right as subsequent events have shown. The present condition of the electric light shows it; for the electric light can be converted back into the force of gravity. I mention this to show that the doctrine of the convertibilty of forces must apply to the production of the electric light; and, if it is applied, then we know that the electric light is made at an immense expense of friction and loss of power. On the other hand we know that gas is made directly from the coal, and that, in its production, there is no such loss from friction.

Mr. Smith—I can bear out the statement of Professor Douglas, by a statement of facts in our own place. What he says is perfectly true. Our electric company started with 100-horse power, and expected to produce 100 lights with the 100-horse power. They used that same engine to drive other machinery during the day and thought they could use it at night for generating the electric light. The first night they started they thought it was first-rate, and that they could use it in this way right along. But in a day or two they found that the engine was out of order, and soon learned that one engine could not do all that they were expecting of it. Then they got another 100-horse power engine, but ran it from the same boiler, and intended to use it for the generation of the electric light. They soon found that the boiler wanted cleaning out; the boiler could not work both day and night; and they had to get a new boiler to drive the new engine. This shows that the force which they had at first expected to use was not equal to the requirements, and they had consequently to get the boiler and engine duplicated. The best way is to let the electric light men have their own way. Practical experience is what they need. After they have learned from experience we gas men have not much to fear in the way of competition. In our place many of the store-keepers still keep the electric light on the outside of the store merely as an advertisement, while inside they have gone back to gas light.

Mr. Gimper—I was very much pleased with what Professor Douglas said. He demonstrated very scientifically a fact which I have often asserted to our people. I have told them that if I took 100 pounds of coal, and made gas from it, that 100 pounds of coal would generate more candle power than 100 pounds of coal would furnish when converted into steam, and the steam used to generate electricity. That is what I have always believed, and have always said.

Mr. Brown—While we are on the subject of electric light, I wish to speak of another application of electricity; and to inquire whether any member has tried the experiment of lighting and extinguishing gas by electricity. There is a company in Boston which lights and extinguishes the gas all over the city. It seems to me to be a good thing. If it can be done cheaply, it is certainly a good thing. Has anyone had any experience in its use?

Mr. Starr—I have been working at that thing in our town for seven or eight months. We have about 100 lamps that we light by electricity. There are some defects in the plan. The trouble with us has been that the water will run down over the wire and form a connection, and thus light the lamps. We hope to perfect the plan in some way. We have the wire covered, but at the point where it has to be scraped bright, and put in under the post of the magnet, the wire is exposed, and when the water runs down sufficiently to cover the wire and insulator, the current is connected and the gas is lighted. We keep a taper constantly burning. So far it has used a great deal more gas than was used by the old plan. We employ three or four lighters, and we start them out three-quarters of an hour betore the time of lighting. It is the same way in extinguishing. That plan costs an average of one hour per day of a 4-foot burner. We want to reduce our taper to half that and burn it through the day. If we can do that, then the waste of gas will be less. The saving to us in lighting by electricity will be in the breakage of lamps. We use a good many solid globes; and the boys, in putting their torches up through the globes, break a great many of them. We have the Bartlett burner. It is lighted very easily by pushing the torch up through the globe. The men never carry a ladder. In the summer time the electric lighting works first-rate. We can light and extinguish twenty times a minute. We do not put the gas out entirely, but leave a little taper burning. It has been a little expensive so far. I have about fifteen miles of wire for it; it will take over twenty before it is completed. It has cost us about $1,500 thus far. I will pay $1,500 more to make it a success. The greatest annoyance we have is the lamp-lighter. I think one of our troubles last winter arose from the fact that we discharged our electrician, and after that we had considerable trouble for a while. The wire did not seem to work so well under new hands.

Mr. Brown—The lighting arrangement which I speak of requires no torch. The current of electricity opens the stopcock and lights the gas. It is an application of the principle of the expansion of metals by heat. It seemed to me to be a very satisfactory arrangement.

Mr. Starr—How long since you saw it?

Mr. Brown—A year ago, in Boston.

Mr. Starr—I made inquiries for it a year ago, but could not learn about it.

Mr. Thomas Butterworth (Rockford, Ill.)—If you gentlemen had attended the meetings properly you would have known all about this plan months ago, At one of the conventions a gentleman from Boston explained how they had tried the plan, but found that they had to send out a man every night to see whether the thing worked; and that it cost more money to look after the machinery than it did to light the lamps.

Mr. J. H. Woodmansee (Danville, Ill.)—Has Mr. Starr experienced any difficulty from the stoppage of the little tubes in which the taper burns?

Mr. Starr—That is one of the troubles. We have been experimenting with a dozen things, in order to find a valve which will not wear. We find that too much gas goes through, and we have to put in new valves continually. We have tried gum, lead, cork, and various other things, and are still experimenting. I will not be bothered with it again through the winter. I mention this not because it is a success, but because I do not want to excite any interest in it until I know that it is a success.

The President—If there is nothing further to be said on the electric light, we will listen to the reading of the next paper, by Professor Douglas.

[To be continued.]

The Management of Small Gas Works.

By C. J. Russell Humphreys.

[Continued from page 267, Vol. XXXVIII.]

In the gas works built on a plan similar to that illustrated at the beginning of these articles, the main portion of the tar will be removed from the gas at the zigzag scrubber; this will leave the condensers free to do the work which should alone be required of them, namely, cooling the gas. Thermometers should be placed in the main pipe at the inlet and outlet of these apparatuses, and the temperature of the gas at these points should be taken at least three times a day; moreover, after each reading, the flow of water through the condensers should be so adjusted that the gas issue therefrom at 60° F.

After passing through the machines of which we have been speaking, the gas will next enter the exhauster, provided the works is supplied with such an apparatus. This brings us to the question, what is the smallest sized works which can economically use an exhauster?

It is easy to put such a query, but well nigh impossible to answer it in a word, because circumstances alter cases. Thus, in some sections of the country it is necessary to have a steam boiler, even in the smallest works, in order to keep the water joints from freezing. To cover such a case, we would say that, even in a works making as low as 2,000,000 feet a year, it will pay to take the pressure off the retorts if for any other reason it is necessary to carry steam. For the smallest works, the steam jet exhauster offers several advantages in that it is cheaper in the first cost, and less expensive to run than those of the rotary type. We would, however, advocate placing it before the condensers, as we are averse to allowing hot or even warm gas to enter the scrubbers. The point will doubtless be made by some of our readers that in a works making only 2,000,000 feet a year, even where steam is maintained for part of the year, the saving resulting from the use of an exhauster would not pay for the interest on the plant. Let us see if this stricture be sound. In the sized works we have mentioned, there will be made during the five winter months about 1,200,000 feet of gas. The cost of the small jet exhauster and connection would not be over $400. The interest on this sum would be $24, the running expenses for the machine for the period stated would make the figure about $50, or 4 cents per 1,000 feet, to which we must add, for extra fuel, say four bushels of coke at 6 cents—$36 for five months, or 3 cents per 1,000 feet, making a total of 7 cents.

On the other hand, our experience would lead us to say that the yield from a given coal is reduced 15 per cent. when an exhauster is not used. This would be about the average loss. If a works has been running with one of these machines and it is then thrown out of action the decrease in the yield will

be greater for several days than that mentioned, because the numerous small fissures in the retorts will allow considerable gas to escape where the full pressure is thrown on them. After a while, the cracks will stop up with carbon and mitigate the evil, but on the average, where no exhauster is used, the yield will be lowered about 15 per cent. by the omission. Now, if we assume the net cost of coal to be $3.75, a fair figure for so small a factory, and 11,000 feet as the normal yield, it follows that the cost of coal per 1,000 feet with an exhauster would be 34 cents, without 40 cents, showing a saving of 6 cents in favor of the exhauster. The extra life of the retorts when the pressure is removed, will be represented by 1½ cents per 1,000 feet, leaving a net gain of 1½ cents per 1,000 feet, to be credited to the exhauster.

We must next consider the case, where steam is not used for other purposes in the works, in what sized works will it then pay to introduce one of these machines? In such an event we would fall back on the rotary exhauster, which we would drive with a gas engine. The cost of the combined plant would be about $750, the interest on which would be $45 dollars a year; the gas used by the engine would be 20 feet an hour, and we would allow that it was run on an average of 15 hours a day, this would be 300 feet of gas used per diem, or 109,500 feet a year. The expense of making this gas could be fairly put at 60 cents per thousand feet, equalizing $65.70 for the total. Lubrication would cost $20, while repairs may be placed at $25 per year; sundries, $10. We thus have a total charge against the plant of $165.70 per annum. We have already shown that where the exhauster is used there is effected thereby a saving on coal of 6 cents per 1,000 cubic feet; repairs of retorts, 1½ cents; total, 7½ cents.

By dividing this figure into 165,700 we will find that in a works making 2,200,000 feet a year, it would be justifiable to introduce one of these machines. True, according to our figures, it would only just pay in a plant of this size, without any margin for contingencies. We think, though, that the gain in luminosity of gas and the saving in labor and fuel, on account of not having to clean out the retorts so frequently, offer plenty of margin; so that our opinion is, an exhauster may be introduced in a works making from 2,000,000 to 2,500,000 feet a year. In our estimate of the cost of plant we have allowed for a compensator, and we would say here, that no gas works running an exhauster should be without this safeguard.

.We may now pass on to the consideration of the washer or scrubber. Speaking generally, we prefer the former class of machines, though we are free to admit that here, as elsewhere, circumstances alter cases. Thus, if there be no frictional condenser in use for removing the tar, the washer will deal with such tarry gas better than a scrubber. If a washer be employed, it should be designed with the idea of breaking up into small streams the current of gas passing through it; secondly, it is entirely unnecessary to run the washer with a heavier seal than three inches, in fact the depth of the liquor may safely be reduced one-third from this figure. It was owing to the lack of attention to these two points that the washer came into disrepute.

Mr. Anderson and Mr. Livesey have been instrumental in giving this vessel its true position among the valuable adjuncts of gas works. Under no circumstances should a washer be placed between the hydraulic and exhauster.

Of the various styles of scrubbers, our preference is for the tower style, because such are not dependent for their proper working on motive power.

We are not ignorant of the fact that the water has to be pumped to the top of the tower scrubber; but the point we would make is, that by having a moderate sized tank at the top of the scrubber, no harm would result from the stopping of the machinery for a while; whereas, in the other form of scrubbers which we have in mind, it is the motive power which brings the gas and water in contract with each other. Nevertheless, the latter class of vessels—and we must give the "Standard" a high position in the catalogue—offer one great advantage to small works, in that by their aid the liquor can be worked up to a considerable degree of strength. This is often a matter of importance in a small concern. Thus, such a company may be so placed that it could not afford to ship liquor of 7 or 8 ounces to market, because the carriage rates would absorb all the profit; but by working the liquor up to say 14 ounces, it might be possible to sell the product and make some money on the venture. This is a matter it will pay the managers of small works to look into and examine with all carefulness.

When the tower scrubber is employed, we would give preference to the filling of slats or thin boards rather than coke, brickbats or other such material.

The pressure of the water may well be utilized for effecting its own distribution, the simplest contrivance for this purpose being an "overshot" water-wheel. Care must be exercised to have the wheel of a size and lightness proportionate to the quantity of gas to pass through the scrubber, in order that the apparatus may be worked with the minimum quantity of water, say from 1 to 1½ gallons per 1,000 feet of gas passed.

[To be continued.]

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

Equitable Gas Light Company, New York City.—At a late meeting of the directors of the Equitable Gas Light Company, of New York city, a motion was passed increasing the number of directors to eleven; and the following named gentlemen were chosen to the positions thus created: Messrs. R. T. Wilson, G. C. Benedict, and Jacob Bertschmann. The names of the other persons comprising the board of directors will be found in our issue of June 2.

An Open Fanlight Saved Him.—At an early hour on the morning of June 27 a strong odor of escaping gas was noticed on the top floor of the Hotel Everett, in Chatham street, New York City. The night clerk, Wm. H. Carman, was informed of the fact, and he ascertained that it issued from Room 76, which had been engaged by a man named Smith Wilcox, a dealer in and grower of fruit trees, whose home is at White Plains, N. Y. Wilson had retired to his room for the night at about 11 o'clock. Carman ordered the door to be forced, and Wilson was found lying on the bed, in an insensible condition, suffering from the effects of having inhaled illuminating gas. An ambulance was summoned, and the patient conveyed to the Chambers Street Hospital, where restoratives were administered. Mr. Everett, the proprietor of the hotel, stated that there could have been no suicidal intent, as he knew Mr. Wilson very well, and that the gentleman was in good business circumstances; and, further that he had been in the habit of stopping at the Everett House when visiting New York city. Mr. Wilson must either have blown out the gas or turned the cock on again after turning it off. The windows of the room were closed, but the fanlight over the door was open, and it was due to this fortunate fact that the danger was discovered before the man was dead.

"Knocked Over" in a Trench.—About two o'clock on the afternoon of June 26, a man named William Smith, an employee of the Greensburg (Ind.) Gas Light Company, while tapping a street main, preparatory to installing a service pipe, was completely overcome by the escaping gas. He was conveyed to his home, where he now lies dangerously ill. A patent oil gas process is in use at Greensburg.

New Station Meter for the Louisville (Ky.) Gas Light Company.—The Louisville Gas Light Company is having a new station meter constructed; it is calculated to pass 1,000,000 cubic feet in twenty-four hours. The American Meter Company is doing the work.

Lighting the Southern Exposition Buildings at Louisville, Ky.—A contract for lighting the buildings in which the Southern Exposition is to be held was entered into with the representative of the Edison Company for isolated lighting. The buildings are to be lighted with 4,600 Edison incandescent electric lights, of a nominal candle power of 16 candles each. The amount of copper wire used will weigh 40,000 pounds, and, if stretched out, would reach 40 miles. It will take the labor of 100 men working steadily for one month, to install the plant. Fifteen dynamo machines will be required to furnish the current, and the cost of these alone will be in the neighborhood of $60,000. The power will be furnished by four Armington & Sims engines, and one large Reynolds-Corliss engine, the latter being provided by the Exposition Company. It is estimated that the total cost of the lighting equipment will be fully $100,000. The grounds surrounding the buildings, as also the courts, will be illuminated by 75 arc lights; the usual 2,000-candle statement holds good, of course, for each "arc" light. The Exposition people had better put in the gas pipes too, for it is more than likely that "the belt might slip."

Resignation of Mr. Egner.—Mr. Frederic Egner, whom we stated, in the last number of the Journal, had taken charge of the Division street station of the Peoples Gas Light and Coke Company, of Chicago, Ill., has resigned the position.

They will be Ready in November.—The Consumers' Gas, Fuel and Light Company, of Chicago, Ill., expect to be in complete working order, and ready to supply gas about the middle of November.

Wilmington (Del.) Gas Matters.—The Wilmington Gas Light Company, of Wilmington (Del.) has added to its plant a new purifying house, the dimensions of which are 60 × 118 feet. The new house contains four purifying boxes, 20 × 24 each, also new condensing apparatus, and a "Standard" Washer-Scrubber. As an instance of cheap street lighting, this company affords an excellent specimen. The street lights burn all night, and every night in the year—the table calling for 3,600 hours of burning, but in reality the actual number of hours is nearer to 4,000. The lanterns are equipped with 5 and 6 feet burners; the company light, extinguish, clean and repair. For this service the city pays the company $20.95 per lamp per

year; and, when everything is figured down, the city pays about 80 cents per thousand for the gas consumed in lighting its streets. Private consumers pay $1.50 per thousand, and gas for heating, cooking, and power is supplied at $1.25.

WHO ARE THE GUILTY PARTIES?—Gas men who happen to call on Superintendent A. C. Wood, of Syracuse, N. Y., after business hours, will find him taking his ease in an elegant reclining chair, which came by express the other day all the way from Boston. There was no word of explanation accompanying the mysterious arrival; but the recipient rather surmises that the members of the New England Association, who attended the late Bradford meeting of the Central New York Association, know something about it.

DON'T WANT IT ANY LONGER.—Elgin (Ills.) has dispensed with the "Springer" process in the manufacture of gas.

DEATH OF MR. J. D. MERRIMAN.—It is with deep regret that we announce the death of Mr. J. D. Merriman, whose demise occurred on the 10th of last June. It will be remembered that, in the JOURNAL of May 16, we announced that Mr. Merriman had been appointed manager of the Vera Cruz (Mexico) Gas Light Company. He reached that place on the 20th of May, and immediately assumed the duties of his position. On June 4th, he was stricken down with that terrible malady, the yellow fever, and succumbed on the 10th. Mr. Merriman was connected with the gas industry for a long period; and had been quite an extensive traveler. He built works at a great many points in South America, and prior to his leaving for Vera Cruz, was connected with Picton Gas Light Company, of Picton, Nova Scotia. Mr. Merriman was a respected and esteemed member of the American Gas Light Association, a through, whole-souled gentleman, and an intelligent, wide-awake and progressive gas engineer.

THIS IS HOW IT SHOULD BE DONE.—The Lacrosse Gas Light Company, of La Crosse (Wis.) believes in the efficacy of printers ink, and so caused the following notice to be inserted in the *Morning Chronicle* of that city. "Go thou and do likewise."

OFFICE LA CROSSE GAS LIGHT CO.,
June 19, 1883.

To our Customers and the Public:

"Three years ago we made plans with a view to enlarging our works and reducing the price of gas to consumers as low as it could be manufactured. With this object in view the needed improvements were commenced. Additions and alterations already made, consisting of a new retort house, four benches of five retorts each, new gas holder of increased size, new condenser, scrubber and station meter, have increased the capacity of the works nearly threefold; this with other apparatus now in process of construction will enable us to supply all probable demands. At no time during the past ten years has the rate of burning gas in this city been sufficient to warrant so large an outlay of money, but we were induced to make it, confidently believing that public appreciation of a large reduction in price would cause a corresponding increase in the rate of burning. In accordance with our intentions we will therefore from and after the first day of August next supply gas to consumers at the rate of $3.00 per 1,000 feet as registered by consumer's meter, with a discount for prompt payment (that is if paid before the 10th of the month) of fifty cents per 1,000 feet, thus making the actual price to be paid, if paid promptly, $2.50 per 1,000. This is fifty cents per 1,000 feet below our present rate, and can scarcely be maintained unless there shall be an appreciable increase in consumption.

"For the benefit of those who may still think that the new rate to be charged for gas in this city is yet unnecessarily high we give below the rates at which it is supplied in the principal cities in this and adjoining states:

	per 1000
Green Bay	$3.00
Madison	3.50
Watertown	3.00
Beloit	3.30
Milwaukee	2.25
Oshkosh	3.00
Sheboygan	3.25
St. Paul, Minn	3.40
Winona	3.00
Dubuque, Iowa	3.50
Clinton, Iowa	3.50
La Crosse	$2.50 per 1000 net at new rate

"A glance at the above will show anyone that the people of La Crosse will then be supplied with gas at rates lower than the people of our neighboring cities, except Milwaukee, whose large population and superior advantage in freight and coal, render a lower rate possible.

"It is needless for us at this late day to adduce arguments in favor of gas as a means of general lighting and of its superiority over other methods. It is in such general use that its qualities and excellencies are well known. But there are other uses which are not so generally comprehended. In the summer when it is desirable to avoid the artificial heating of houses, gas is found to be as convenient for cooking purposes as for illuminating. The low price at which it will be furnished will make it almost as cheap as wood. It is clean, convenient, is perfectly safe and easily managed. It can be used wherever and whenever wanted without trouble. Particular information as to appliances, manner of use, cost, etc., for cooking and heating given upon application.

"Another use to which gas has been put to advantage is the running of small engines, giving an economical power for sewing machines, printing presses, elevators, lathes, etc., cheaper and with less trouble than steam. It requires no boiler or cumbrous apparatus, and therefore little space. Those engines are now for sale in the market at reasonable prices, and supply a want long felt by those in need of a safe and economical power."

THE BROOKLYN GAS WAR BREAKS OUT.—We announced in our item columns of the last number of the JOURNAL that the Fulton Municipal Company of Brooklyn, N. Y., had reduced the price of gas, on June 1, from $2 to $1.75 per thousand. On a later date the same company made a further reduction to $1.50 a thousand, and on July 3, gave notice that on and after July 1, the price of gas supplied to consumers would be $1 per thousand. The break in rates has been expected for some time back, and now that such a result has been arrived at, the poor, dear people are convulsed with joy. The poor, dear public had better save some of its convulsive energy for the sad and dreary time which awaits it in the future. When the smoke and dust of the action clears away, and the final settlement is reached, the gas companies will not be the occupiers of the gory trenches dug to receive the bodies of the slain. Save your energies, then, poor, Brooklyn consumer; you will need them all to enable you to "kick."

To enable our out-of-town readers to get some idea of the true inwardness of the Brooklyn situation, we will here state that this city (containing about 670,000 inhabitants) is blessed with the possession of seven establishments for the manufacture and sale of illuminating gas. The last to enter into the race was the Fulton-Municipal Company; this concern, at its inception, experienced a rather precarious time, meeting with many and various troubles, and called itself originally the Mutual Gas Company. There are a great many people in this and other parts of the United States who would like to know what has become of the "Mutual" company, since the only thing by which its former existence can be traced is the evidence of numerous accounts still left unpaid; and one of these accounts may be found on the subscription list of this JOURNAL. You will find intelligent men who deny that such a bird as the Phœnix ever had any real existence; and, arguing the thing out on the same line, you will find people who will say that the Fulton-Municipal Company did not rise from the ashes of the Mutual Company; but, somehow or another, the feathers on the birds comprising the two boards of direction appear to the average onlooker as though they might fit in the same quill-sacks. Be this as it may, and should the Fulton-Municipal prove to be the veritable and living example of the only known specimen of the fabled bird, it will furnish naturalists great joy to know that the principal food of this particular Phœnix is water and oil—not olive oil, not sweet oil, not lard oil; in fact, a light oil, called by those in the trade, a naphtha oil, a sort of secretion which is given off in great quantities by a certain monster supposed to be centrally located in Cleveland, and known to fame by the appellation of the Standard Company. This monster has no use for this light oil, and has assured the Phœnix under consideration and his near cousins, the gulls, that the light oil "beats the world" for keeping feathers bright and shiny; and now that we have discovered the identity of the "bird," and shown to natural history the very substances upon which it feeds, we will proceed.

When the Fulton-Municipal Company surveyed the Brooklyn field, the policy of absorbing all the other competitors was first tried, but this did not work. The next move was to quietly absorb such stock as it was possible to get hold of—and after a while they succeeded in acquiring control of the Citizens, Metropolitan, Peoples, and (although they deny this last) the Williamsburgh companies. They either did not want, or could not get, (most probably the latter) control of the Brooklyn and Nassau companies. The Fulton Company has suppplied gas to the Citizens, Metropolitan and Peoples holders for some time back, these last three concerns having shut down their manufacturing plant entirely. The Williamsburgh company is still working under the coal gas process; but how long it will continue to do so is one of the conundrums involved in the situation.

When the reduction to $1 per thousand was announced the old Brooklyn Company immediately followed suit, as also, we believe, did the Nassau Company. We suppose the coal gas companies thought it would be a good thing to fight the Phœnix with fire—and we think they are right.

The reduced price only takes effect in the district occupied by the Fulton,

Brooklyn, and Nassau Companies. For instance, the consumers in the district known as South Brooklyn pay $2.50 for gas, while those in the other parts of the city pay but $1. President Benedict, of the Fulton Company, when asked why his company had reduced the price of gas to such a low figure, said that the object was to sell more gas, and also said that he was not in a positson to determine whether his company would make any money when selling gas at $1. The following are a few more of the questions put to him, and the replies made:

"Can water gas be manufactured and sold at a profit much cheaper than coal gas?"

"Some say yes and some say no."

"What do you say?"

"I say I can make water gas cheaper than I can make coal gas. That is my impression."

"Do you think coal gas can be manufactured and sold at a profit at $1 per thousand cubic feet?"

"That is a matter of economical management. Some companies make gas cheaper than others, because they manage their business economically. It's the same as in any other business. The great element of expense in making gas is in the renewal of works, the distribution, and the machinery."

"Is the reduction for any stated period of time, or indefinite?"

"There was no time fixed."

"Are you prepared to state that the reduction is a declaration of war on the part of the Fulton Municipal Company?"

"What is it, then? The policy of the company was declared a long time ago. The Company is making the best gas in the country, and our object is to supply it to people in one way or another. I am talking now as a citizen, and not as a representative of this company."

"If your company should obtain control of the gas business in Brooklyn, are the people to look for an increase of price in the future?"

"I don't know what policy will be pursued."

Mr. Benedict's impressions about gas making would hardly fill a book; and his knowledge as to what his company would do, should it obtain control of the situation, is very amusing.

A prominent official in the Brooklyn Company, when asked as to what he thought the outcome of the present gas war would be, said:

"Why, prices will go up like they did under similar circumstances in New York, and the ultimate result will be disastrous to consumers. This is plainly to be seen by a glance at the prices of gas in South Brooklyn. They have a monopoly of that part which is bounded on the side by Atlantic and Flatbush avenues, and the price of gas there is $2.50. If the people avail themselves of cheap gas for a time, to the detriment of the old companies, they will suffer for it in the long run."

It is the old, old story once more illustrated; and that is why we advise the Brooklyn consumer to reserve his energies."

Carburetted Poison.—On the morning of July 6, a servant at the Scranton House, Scranton, Pa., had occasion to visit one of the rooms on the third floor of the building. She found the door locked, and noticed a strong smell of gas in the corridor. The clerk was summoned, and, no response being made to repeated knocking, broke open the door. Those who entered the room were horrified to find a young woman named Mary Swift lying on the bed in the stifling apartment apparently dead. The gas was turned on full head. The unconscious woman was speedily removed to the Lackawanna Hospital, where she still lies insensible. She arrived at Scranton late on the night of July 5, and was on her way to the home of her parents, at Olyphant, four miles distant, but as there was no train running at the time, she remained at the Scranton House. It is thought she cannot recover. This is the third case of blowing out the gas at the Scranton House within a few weeks. One of the cases proved fatal, and it is not likely that Miss Swift can recover.

The Foster Beacon Light.—The United States Lighthouse Board has ordered that one of the Foster gas lighted buoys be placed in New York Bay, off Sandy Hook. The light, when in position, will be 16 feet above water, and is to surmounted by a Fresnel lens, 12 inches in diameter. It is expected that the light will be distinctly seen at a distance of 10 miles.

Explosion of Gas.—A gas explosion occurred at No. 14 Beaver street, New York city, on the morning of July 7. Axel Holstein, aged 39 years, was severely burned about the face and hands.

Bradford Oil Production.—In 1880, Bradford produced 22,300,000 barrels; in 1881, 23,000,000 barrels; in 1882, 18,000,000 barrels.

Differences in Production of Oil Bearing Sands.—The brown sands of Bradford and Allegheny have produced 92,910,000 barrels of crude oil in eight years, while the white sands of Venango, Butler, Clarion, Warren and Forest counties have produced only 122,258,000 barrels in twenty-four years—facts suggesting that the brown sands are more productive than the white, or else that they are capable of more rapid and successful development.

Natural Gas Company Chartered.—A charter has been granted to the Acme Gas Company; this concern proposes to supply heat and light to the people of Bessemer station, Allegheny county, Pa., from the Murraysville natural gas district in Westmoreland county. The principal office is to be in Pittsburgh, and the capital stock is fixed at $35,000.

Commissioner Raymond's Report on the Relative Dangers of Coal and Water Gas.—On April 6, the Common Council, of Brooklyn, N. Y., authorized Health Commissioner Raymond, of that city, to make an investigation as to the relative dangers of coal and water gas when viewed from a sanitary standpoint. This report has just been handed in, and is about the weakest statement ever gotten together. Commissioner Raymond expresses no opinion of his own as to the greater danger of water gas, and leaves the question in just the same position that it was before. The statistics given as to the number of fatal cases of suffocation have not been verified, and the whole subject has been treated in the most careless and slipshod manner. Professor Ira Remsen, of the Hopkins University, of Baltimore, Md., was selected as an expert by Commissioner Raymond, to make a chemical analysis of samples of the two kinds of gases; and after stating that the sample of water gas submitted to him for examination contained 28.25 per cent. of carbonic oxide, while the sample of coal gas examined contained but 7.9 per cent., goes on to say:

"Concerning the question of danger to health resulting from the use of these gases, it is, of course, known that the principal dangerous constituent is carbon monoxide (or what is commonly called carbonic oxide). Both these gases contain considerable quantities of this constituent. Both, if inhaled, would produce bad effects, and if inhaled to a sufficient extent both would cause death. I do not think, however, that the percentage of the monoxide present in the two gases is a matter of any importance from a sanitary standpoint. Whether one gas or the other is used, there is danger connected with its escape in unburned condition into rooms occupied by human beings. But long before enough of either to produce bad effects could accumulate in a room, it would necessarily be detected by its odor, for both specimens submitted to me had, as far as I could judge, equally bad odors. In case the occupants of the room would be asleep at the time of the escape of the gas, it is possible that a fatal effect might be reached a few minutes earlier in the case of water gas than in that of coal gas, but it is highly improbable that, in either case, there could be a leak in the pipes sufficiently bad to lead to serious results without attracting attention during waking hours."

The learned Professor admits that the "principal dangerous constituent" in both gases is the contained carbon monoxide, and still, while the same gentleman's analysis shows that the water gas sample contained almost 300 per cent. more of the "constituent" than the coal gas sample, he coolly places himself on record as *thinking*, "that the percentage of the monoxide present is not a matter of any importance from a sanitary standpoint." He does think, however, "In case the occupants of the room would be asleep at the time of the escape of the gas, it is possible that a fatal effect might be reached a few minutes earlier in the case of water gas than in that of coal gas." A little mathematical analysis of the Professor's ideas as to what he considers a "few minutes" would seem to be next in order. The whole report, from which so much was expected, is absolutely valueless and worthless.

The Market for Gas Securities.

Dullness still continues to be the feature of the market for city gas securities. Some weakness has been shown, particularly in Municipal, which is quoted now at from 175 to 180, as against previous figures of 183 to 185. Harlem gas is stronger, at 103 to 106. The other city stocks remain at previous prices. We note a sale at auction of five shares of New York city gas, June 11, at 130⅛.

The music has fairly started in Brooklyn, and although as yet no marked fall has taken place in the Brooklyn gas stock quotations, a decidedly uneasy feeling prevails, with every likelihood of squally times ahead. The investors who are interested in these securities need have no fear as to the ultimate result, and should not part with their holdings. When the Brooklyn business is finally straightened out it will be found that even Brooklyn gas stock is a pretty good description of parchment to have possession of.

In out-of-town stocks we note a stiffening in New Haven stock—152 is bid, with no stock offered. Laclede gas, St. Louis, Mo., is strong; San Francisco gas is also on the improving list. Indeed, the out-of-town shares are all buoyant; the disbursement of interest for the last half year having stimulated investment inquiry for this class of stocks.

THE AMERICAN GAS LIGHT JOURNAL

Gas Stocks.

Quotations by Geo. W. Close, Broker and Dealer in Gas Stocks (with W. B. Scott & co.,)

34 Pine Street, New York City.

July 16, 1883.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share.

	Capital.	Par.	Bid	Asked
Central	$466,000	50	85	90
Harlem	1,800,000	50	103	106
" Bonds	170,000		—	—
Manhattan	4,000,000	50	232	235
Metropolitan	2,500,000	100	187	189
" Bonds	658,000	—	105	110
Mutual	3,500,000	100	117	119
" Bonds	1,500,000	1000	103	105
Municipal	3,000,000	100	175	180
" Bonds	750,000		102	104
New York	4,000,000	100	120	123
Northern	125,000	50	—	95
" Scrip	108,000			
Gas Co's of Brooklyn.				
Brooklyn	2,000,000	25	100	105
Citizens	1,200,000	20	75	80
" S. F. Bonds	320,000	1000	105	107
Fulton Municipal	1,500,000	100	65	70
Peoples	1,000,000	10	45	50
" Bonds	290,000	—	104	107
" "	250,000	—	88	90
Metropolitan	1,000,000	100	80	85
Nassau	1,000,000	25	50	55
" Ctfs	700,000	1000	90	93
Williamsburgh	1,000,000	50	70	75
" Bonds	1,000,000	—	100	101
Richmond Co., S. I.	300,000	50	70	75
" Bonds	40,000	—	—	—
Out of Town Gas Companies.				
Buffalo Mutual, N. Y.	750,000	100	72	75
" Bonds	200,000	1000	95	100
Citizens, Newark	918,000	50	80	85
" " Bonds.	124,000	—	105	10
Chicago Gas Co., Ills.			150	155
Cincinnati G. & C. Co.			178	180
Consolidated, Balt.			42⅛	42⅜
" Bonds			105	106
Central, S. F., Cal.			45	—
Capital, Sacramento, Cal			—	56½
Hartford, Conn	750,000	25	116	120
Jersey City	750,000	20	155	165
Laclede, St. Louis, Mo.	1,600,000	100	100	105
Montreal, Canada	2,000,000	100	186	187
New Haven, Conn		25	152	160
Oakland, Cal			—	29¾
Peoples, Jersey City		—	72	75
" " Bonds			—	—
Paterson, N. J		25	96	99
Rochester, N. Y		50	70	80
Washington, D. C	2,000,000	20	175	—
Wilmington, Del		50	174	—
Yonkers		50	33	35
St. Louis, Missouri	600,000	50	250	254
San Francisco Gas Co. San Francisco, Cal.			59¼	60

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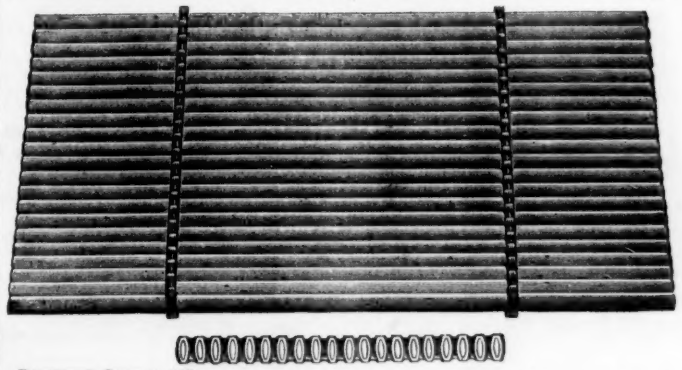

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Roxbury, "	Providence, R. I.	St. John, N. B.	Charleston, S. C.	Champaign, Ill.
Springfield, "	Newport, R. I.	Fulton Munic., Brooklyn.	Selma, Ala.	Detroit, Mich.
Taunton, "	Pawtucket, R. I.	Municipal, N. Y. City.	Jacksonville, Fla.	Lansing, Mich.
Salem, "	New Haven, Conn.	Northern, N. Y. City.	Denver, Col.	Reno, Nev.
Gloucester, "	Birmingham, Conn.	Citizens, Rochester, N.Y.	Lawrence, Kan.	Peoples, Cleveland, O.
Waltham, "	Burlington, Vt.	Passaic, N. J.	Sedalia, Mo.	Lancaster, Ohio.
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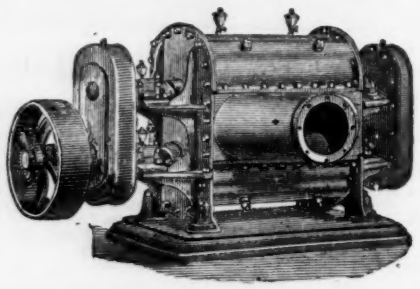

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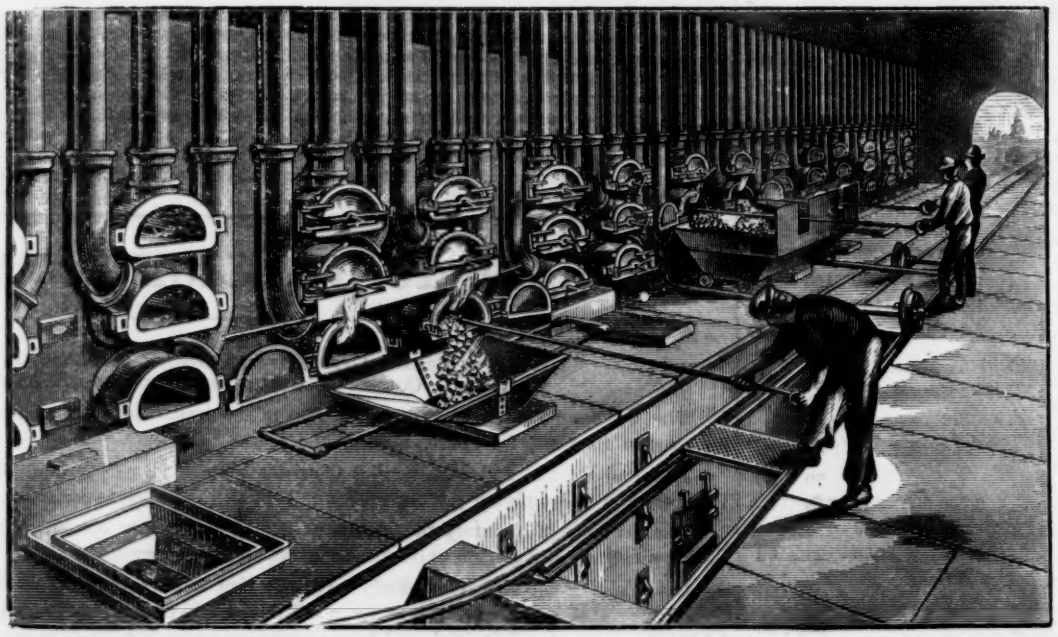

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